

2007-2009 Work Plan Progress Report

March – June 2007

1 Disasters

Good progress was reported in a number of Tasks

Geohazards Community of Practice is being consolidated, through worldwide coordination associated with the execution of tasks DI-06-03 and DI-06-07. An effective coordination mechanism between Users and Providers is now in place concerning the use of satellites in support of Risk Management (reference task DI-06-09). Good progress on the above aspects is giving the proper background for the transition of the IGOS Geohazards theme into the GEO framework.

The activities concerning the implementation of a Global Early Warning System for Wildland Fire are proceeding (reference task DI-06-13) and an “early achievement” – a prototype African component - is expected to be available for the Ministerial Summit in November. Coordination and improvement of global seismographic networks is proceeding satisfactorily (reference task DI-06-13). To raise awareness on the issue and to enlarge the involved Community the Secretariat has co-sponsored a dedicated session, "Operating High-Performance Seismic Networks: Challenges and Tools," at the AGU (American Geophysical Union) Assembly in Acapulco, Mexico May 22-25, 2007. Thirty-three Talks and Posters were presented.

A need for improvement has to be reported in the following areas:

Coordination with ISDR for the implementation of the Hyogo Framework for Disaster Risk Reduction by contributing to the definition and implementation of a multi-hazard risk management approach; The proposed end-to-end projects on Risk Management (one on Geohazards and one on Flood Management) are requiring more than expected to get organized and started. A number of contacts have taken place and consolidation is expected.

2 Health

Significant progress has been made on air quality and pollution transport as well as the Meningitis Early Warning System. Both projects will be reported as Early Achievements at the Cape Town Summit.

3 Energy

Significant progress was achieved through the work of the Community of Practice and the expert group

A core executive of the Energy Community of Practice which involves both NASA and ESA, National Government and NGO representatives, and Universities has been set up to draft the strategic 5-10 Year Plan. A Framework document has been developed and the approach, target audience, essential elements, and expected outcomes have been defined. A face-to-face writing meeting is scheduled for the IGARSS07 Meeting in Barcelona on 24/25 July 2007. The objective is to have a document for the November 2007 GEO Plenary.

The Energy Community of Practice is assisting with the development of a GEOSS seminar at the August, 2007 IPY Geonorth conference in Yellowknife, Canada. They are working with the GEO

Architecture and Data Committee to develop a theme that focuses on sea ice, climate change and energy activities in the Arctic. The International Society for Photogrammetry and Remote Sensing (ISPRS) is a partner in this initiative.

The Energy Community of Practice is working with a User Interface Committee led initiative (US-06-01) to define "...Earth observation priorities common to many GEOSS societal benefit areas, involving scientific and technical experts, taking account of socio-economic factors, and building on the results of existing systems' requirements development processes". A student has been employed for the summer of 2007 to provide background work for this activity.

Members of the Wind and Solar Energy sub-groups of the Energy Community of Practice are gathering and gradually analysing responses to the questionnaires on user requirements. First results indicate that the geographical distribution of the response is broad and representative of GEO regional diversity.

The Netherlands (TNO) (new lead of Task EN-07-02 on Energy Environmental Impact Monitoring) have defined a series of deliverables for that Task. These relate to CO₂ geological storage and include: (i) Methods for base-line site evaluation; (ii) New tools to monitor storage and possible well and surface leakage; (iii) New tools to predict and model long term storage behaviour and risks; (iv) A rigorous risk assessment methodology for a variety of sites and time-scales; and (v) Guidelines for best practice for the industry, policy makers and regulators. Activities in support of these deliverables will link to ongoing EC FP6 project CO₂ReMoVe (and possibly CO₂GeoNet).

France (Ecole des Mines), Germany (DLR) and the US (NASA) have been actively collaborating on the GEO Early Achievement project "Solar Energy Data for Developing Countries: Building upon the SoDa Service for demonstrating the GEOSS potential". As a result the project is progressing as planned and should appear in a number of GEO Ministerial Summit communication documents.

Overall, Task implementation in the realm of Energy is progressing well with major activities being undertaken by members of the Energy Community of Practice. In some cases however these activities only partially cover the multiple aspects of Task implementation. One example is EN-07-02 for which "impact monitoring" aspects are not currently addressed. GEO Members, Participating Organizations and Committees are invited to suggest complementary contributions to help remedy to this situation.

4 Climate

Progress was achieved on a number of fronts:

On reanalysis efforts (CL-06-01), Japan has issued the First Announcement of the Third WCRP Reanalysis Conference and a Call for Abstracts (see http://jra.kishou.go.jp/3rac_en.html). The GEO co-sponsored Conference will take place in Tokyo from 28 Jan to 1 Feb 2008 and examine the following aspects: (i) Applications using reanalysis data; (ii) Comparison and validation of characteristics of each reanalysis; (iii) Data assimilation technique for reanalysis; (iv) Strategy and international cooperation for future reanalysis. Also the conference will not only consider global atmospheric reanalysis but also ocean and land reanalysis.

On key data for climate studies from satellite systems (CL-06-02), CEOS members and associates have designated their Climate Focal points, charged to monitor progress within their respective agencies of the actions recommended in the CEOS response to GCOS Implementation Plan. A clear delineation of responsibilities among Space Agencies with regard to the priority actions is being developed, and climate action teams will eventually be formed. A full progress report was presented at CEOS SIT-20 (19-20 June 2007, Frascati, Italy). Within the US, NOAA is working with NASA to provide analysis of remanifesting climate sensors on NPOESS. A first success can be reported: NASA and NOAA announced on April 11 a plan to restore a key ozone layer climate sensor, the Ozone Mapping and Profiler Suite (OMPS), to the NPOESS programme. This OMPS Limb instrument will

be returned to the NPOESS Preparatory Project NPP satellite set for launch in 2009. With this important announcement one of the priority actions in the CEOS Response (numbered A-8) is fulfilled.

On terrestrial observations for climate studies (CL-06-03), GTOS and its collaborators have made considerable efforts to develop different proposals for a terrestrial framework (standards and methodologies are already available for the 13 terrestrial Essential Climatic Variables ECVs). Two status reports on progress have been prepared and submitted to UNFCCC SBSTA for its 26th session (May 2007). Web pages are currently being created which will contain all the material collected for each ECV. This will allow for the review by all interested stakeholders. Once available, the pages will be accessible through the following link: www.fao.org/gtos/TOPC.html. Final documentation and recommendations will be submitted to SBSTA 27th session in December 2007.

A new POC (WCRP) the Task CL-06-05 (GEOSS IPY contribution) and the activities related to the International Polar Year are on track. With a focus on cryosphere issues, the preparation of the joint GEO WMO Legacy Workshop for IPY is moving ahead. A review of the cryosphere related activities in IPY and their eligibility for continuity beyond the IPY is planned for the Call 2007. The Global Cryosphere Watch recently approved by WMO Congress may provide the appropriate framework in this context for the future. The evaluation will be carried out, taking full account of the requirements as stated in the recently approved IGOS Cryosphere report, and will provide the input to the Legacy Workshop.

In Task on the Global Ocean Observing System (CL-06-06), JCOMM, in close cooperation with partners including the International Oceanographic Data and Information Exchange (IODE), GOOS and GCOS, has been improving the global coverage and data accuracy of the climate-monitoring system. Implementation targets have been defined based on the GCOS Implementation Plan for the Global Observing System for Climate in support of the UNFCCC (GCOS-92).

A strong effort will be required to improve the link to coastal observations, including coordination across the land-sea interface. To this purpose, a subsidiary Panel for Integrated Coastal Observations is being established under the GOOS Scientific Steering Committee in close cooperation with GEO. This new panel will develop coordination and specific projects for coastal ocean observations and related land-based activities, and will provide scientific and technical guidance to appropriate bodies.

On the implementation of a unified approach towards weather, climate and Earth system prediction (CL-07-01), THORPEX and WCRP have developed two draft white papers: one is providing a detailed description of the priority areas for collaboration between the weather and climate communities, and the other is setting out potential socio-economic benefits from a “revolution” in weather and climate prediction. Both papers have been discussed by the WCRP Joint Steering Committee (Zanzibar, 26-29 March 2007) and the WWRP-THORPEX International Core Steering Committee (Geneva, 25-27 April 2007). A revised version of the second paper has been distributed to the participants of the Task Force II Meeting (4-5 June 2007, Geneva).

Overall, Task implementation in the realm of Climate is making good progress with strong Leads identified in all Tasks (with the exception of CL-06-05 “GEOSS-IPY Coordination”). Contributors to the Tasks also play a significant role that could however be strengthened through a better coordination of activities within each Task.

5 Water

The GEO Water Quality Workshop was hosted at the GEO Secretariat at the end of March. Over 50 international participants supported establishing requirements for water quality observations both in-situ and from Space and for short and long term data management. Continuity of current observations and the transition from scientific to operational operations in this area were foci of the Workshop. The

results will be considered by the newly established Coastal Zone Community of Practice in its future work.

A combined project plan and concept proposal has been drafted for the Hydrological Applications and Run-Off Network HARON and contacts have been established by the Secretariat with the Research Infrastructure Unit of EC's DG Research. There is increasing interest in this activity.

6 Weather

Focusing on improving weather information, forecasting and warning, GEO activities in this area included the strengthening of Global Observing Systems for meteorology, weather prediction research, development, demonstration and capacity building. During the reporting period, excellent progress has been made by most of the Task teams. These efforts will benefit not only weather but also diverse societal benefit areas to meet GEO requirements. In general, the weather area tasks are very well designed across the processing cycle from primary observation to information production. The fact that efforts are aimed not only at building on, but also at adding more value to existing systems, could be further emphasized.

In WE-06-01 and WE-06-02, continued efforts have been made towards achieving a fully functional and operational Global Observing System (GOS) for meteorology. The WMO Commission for Basic Systems submitted specific recommendations related to overall operations of the GOS to the WMO Congress for approval. Efforts will be made to ensure sustainable operation of the GOS and encourage activities with respect to the optimization of observing elements and development and deployment of the advanced composite system, and to follow guidelines and recommendations contained in the Implementation Plan for Evolution of Space and Surface-Based Sub-systems of the GOS with particular attention to developing countries. WMO will host the second Optimization Workshop on the re-design and optimization of the space-based GOS to be held on 21-22 June 2007 in Geneva to initiate a review and update of the baseline for the space-based GOS.

In WE-06-03, the 4th Working Group Meeting of the THORPEX Interactive Grand Global Ensemble (TIGGE) was successfully held in Beijing, China from 21-22 March 2007. Very good progress towards building the data archives has been made. Remaining technical issues are being resolved. Excellent collaboration between the 3 archive centres continues. Priority is now being put on tools to access and manipulate data. Metadata contents have been agreed. WMO WIS standards will be adopted for metadata if possible. TIGGE-LAM activities are underway and a provisional report has been agreed. A workshop covering developments in TIGGE and TIGGE-LAM will be held in association with the European Meteorological Society in September of 2007. GEO support is expected in enabling the attendance of a good cross-section of participants from developing countries.

Task WE-06-05 (capacity building for numerical weather prediction) is to assist developing countries in the use of NWP. During the reporting period, a GEO training workshop on NWP was held in Seoul, the Republic of Korea, from 9 to 13 April 2007. The Korea Meteorological Administration (KMA) held the event with co-sponsorship of the GEO Secretariat. Another training workshop is being planned for Latin American NMHS by the INM (Spain) for October 2007 in Santa Cruz de la Sierra (Bolivia). These GEO activities are highly appreciated by members of developing countries.

To establish strong and effective connection and collaboration between research and operational use, and facilitate capacity building and technology transfer, the forecasters training workshop of the Weather Demonstration Project for Beijing 2008 Olympic Games (WE-07-02) was successfully held from 10th to 20th April in Beijing. The trainees were taught to operate the participating systems, to learn the major functions and product generation of the systems. The operational trial of all participation systems will be organized in this summer, and the participant's workshop is planned to be held in Qingdao in September to finalize next year's demonstration. With AREP/WMO and China as

co-leads, these activities will provide future opportunities for GEO Members to benefit from experience and lessons learned from the task.

7 Ecosystems

Significant progress has been made in Ecosystem Classification and Mapping. The classification system framework has been released and mapping activities are underway in North America. Planning is underway for mapping Australia, China and Africa. The global ecosystem classification and map will be a crucial framework for ecosystem characterization, monitoring and accounting of ecological services and benefits.

8 Agriculture

Progress is being made in the area of Agriculture through the organisation of a GEO Workshop on the “GEOSS Operational Agricultural Monitoring System” to be held at FAO in Rome, on July 16-18, 2007. This Workshop is an initiative of Task AG-07-03 and focuses on agricultural monitoring in developing countries. As such the activity is closely linked to Task AG-07-02 on the Agricultural Risk Management. The Task and the Workshop preparation largely benefited from the IGOS Land Report (IGOL), which is currently being finalised. In view of the transition of the IGOS Themes into GEO, the requirements as established by IGOL play a pivotal role. IGOL is largely organising this GEO Workshop at FAO. It is currently planned to use the outcome of the Workshop and above two tasks to initiate work of Task AG-06-01 on the GEOSS Agriculture Strategic plan, which has so far been dormant.

Progress can further be reported in the Aquaculture area, where Task AG-06-02 has received a new co-lead (Bedford Institute of Oceanography, CDN). A number of proposals have been made to move the Task forward, including the organisation of a workshop (following the successful model for the *in-situ* chlorophyll observation network in GEO) to connect major players in that field, the involvement of the International Ocean Colour Coordinating Group IOCCG, and the coordination of the Task activities, for instance with a Japanese coordination initiative of remote observations, the Northwest Atlantic Ocean SHRIMP initiative and the successful Indian work deducing potential fishing zones from remotely-sensed imagery and disseminating the results to artisan fishermen in vernacular languages. A link with the coastal activities in the framework of the IGOS led coastal zone Community of Practice is also foreseen.

Under Task AG-06-04 on Forest Mapping and Change Monitoring a Forest Community of Practice has been established and the preparation of the 2008 Forest Monitoring Workshop is underway.

No progress can be reported from Tasks AG-06-07 on Training Modules for Agriculture, the POC of which resigned early in 2007 and Task AG-07-01 on Improving Measurements of Biomass, for which so far neither a POC nor a Task lead could be found. Generally, the progress in the Agriculture Tasks is rather slow and not comparable with progress in other SBAs. This remains an issue of concern.

9 Biodiversity

Significant progress has been made in initiating the GEO Biodiversity Observation Network. The Network was launched through the GEO BioObservation.org website with a declaration and mechanism to join the network at <http://www.bioobservation.net/>. The USGS/NBII-supported Global Data Toolkit (GDT; <http://rockyitr.cr.usgs.gov/gitan/>) has been expanded in both data content and functionality. A GDT module for assessing threatened and endangered species assessments and maintaining and updating global species assessments is being developed with IUCN and the Zoological Society of London.

The Biodiversity Observation Network model web portal (GITAN-GDT) will be linked with the GEO WebPortal. A CBD/GEO side-event planned for the upcoming July CBD SBSTTA dealing with the release of a new Sourcebook that addresses the use of remote sensing technologies to support the CBD 2010 goal

Discussions were held with the Census of Marine Life to strengthen the marine and freshwater components of the planned Biodiversity Observation Network, along with planning for an Earth Observation for Marine Biodiversity Workshop later this year.

In protected area data management and monitoring, a protected areas workshop will be organized in Paraguay hosted by IABIN, Guyra, USGS/NBII and GEO. There are also further efforts to coordinate with the EC JRC Africa Protected Areas project: <http://www.tem.jrc.it/PA/intro.html>.

The Specimen and Species data Task has been furthered significantly by GBIF, and a GBIF, University of Ottawa, ESA/FAO biodiversity and climate change demonstration is being prepared for the Cape Town Ministerial Summit.

Finally, a new 2007 Biodiversity Task, the Invasive Species Monitoring Network has been initiated, being led by NBII and NASA.

10 Architecture

The Radio Frequency Protection task (AR-06-11) organized significant advocating activities through national and international bodies in charge of frequency management.

GEOSS Architecture Implementation Pilot task (AR-07-02) organized Request for Information (RFI), Proof of Concept Phase and Call for Participation (CFP). A kick-Off meeting (ESA/ESRIN, June 5-6 2007) initiated the Execution Phase for GEO Web Portal, GEOSS Clearinghouse and Services involving wide GEO community. There were 35 responses of the CFP. A demonstration of the Pilot with user case scenario is seen as a high priority for the Ministerial Summit. As for the user scenarios and related user requirements, cross-coordination between the GEO Committees will be essential.

GEOSS registries (Component, Service, Standard and Special Arrangement) were developed and are ready for testing and evaluating under task AR-07-01. George Mason University is processing the hosting the registration system for GEOSS Component and Service Registries, and IEEE contributed to hosting the Standard and Special Arrangement Registries. In conjunction with GEOSS Architecture Implementation Pilot task, participants of the Pilot have been encouraged to register their components and services to facilitate the evaluation of the system and procedure.

A GEO Standard Interoperability Forum (SIF) has been established to organize for consulting the GEOSS Interoperability Arrangement for Members and Participating Organizations. A CFP to organize the SIF has been released to the GEO community. For testing the GEOSS Interoperability Process and Arrangement, GEOSS Interoperability Process Pilot Projects have also been conducted on several test components such as GBIF, WIS, CEOP and FDSN. These activities are on-going under task AR-07-01.

Two Global Geodetic Observing System (GGOS) 2020 documents (strategy and reference) are being drafted by task AR-07-03 led by IAG/GGOS, in order to provide guidance for a basic geodetic reference frame for the GEO community. The forthcoming GGOS 2007 workshop at ESA/ESRIN on November 5 and 6 has also been prepared.

Task AR-07-04, WMO Information System (WIS) - GEOSS Operational Exemplar, established the next five year plan. The implementation of the first operational GISC (Global Information System Center) will be in 2008. DCPCs will be implemented during 2008-2011. WIS has been also participated in and contributed to the GEOSS Registry and IPPP (Scenario coordinated by using

TIGGE, NCEP reanalysis), and GEOSS Architecture Implementation Pilot activity through IPPP. A wider involvement and assistance of the GEO community on both standard and information technique and user requirements will be critical for the success of the following steps.

11 Data Management

The White Paper on Data Sharing Guidelines (DA-06-01) has been completed and submitted to the Executive Committee. An updated version will be available for GEO-IV, to support the Ministerial Summit Declaration.

The GEOSS Data Quality Assurance Strategy (DA-06-02) is being developed in close cooperation with CEOS. The preparation of a Workshop in October is being finalised. As part of this Task, a portal on calibration and validation of data is under development.

Several national meteorological services have joined the Ensemble-Technique Forecasting Demonstration (DA-06-03). Sea Surface Temperature, combined from different data sources, has been selected as a case scenario. This will be an Early Achievement showcased at GEO-IV and the Ministerial Summit.

Since using high resolution SRTM data to produce a global, high resolution DEM (Task DA-07-01) did not appear feasible, Task members have turned to an alternative data source (ASTER) which should lead to a global DEM of comparable quality.

NASA has established a systems engineering team for the Virtual Constellation Task (DA-07-03). In the meantime two more candidates have been identified as potential future constellation (Ocean Colour, Disaster Management).

Task DA-07-04 (Sensa Web) held a workshop in February in Cape Town. An increasing number of *in-situ* network operators take interest in this coordination effort. The development of the Sensor ML has been retained for Task.

Under the Task DA-07-06 core working teams were being organised and the Task activities are about to start.

Little or no recent progress was reported on several Data Management Tasks, i.e. DA-06-04 on Data, Metadata and Products Harmonisation, DA-06-05 on the Guidance Document for Basic Geographic Data, DA-06-09 on the GEOSS Best Practices Registry, DA-07-05 on Higher Level Data Product Tools and DA-07-06 (Data Integration and Analysis System).

12 Capacity Building

As was noted at the 4th Capacity Building Committee meeting on the 31 May-1 June the implementation of the capacity building strategy is progressing in most cases:

Preparations of logistics and content for the Capacity Building Symposium (CB-07-01a), to be held on 10 and 11 September in Seville Spain, are on track. A draft Agenda and publicity material are being finalised and speakers and participants are being confirmed. The symposium is being used as one of the regional events in the build up to the Ministerial. In addition to providing the venue, Spain have made available 150 000 Euros for the symposium.

Results from the Capacity Building Survey (CB-07-01b), conducted to determine the extent, nature of capacity building efforts amongst GEO Members and Participating organisations, are being consolidated into a report which is being prepared for the Capacity Building Symposium. In addition to the survey, a list of requirements for the capacity building portion of the GEO Portal has also been developed and shared with the Architecture and Data Committee.

UNEP has finalised a participatory model for building national capacity for environmental networking, observing/monitoring, and data and information sharing. The model, to be implemented with the involvement of national entities, will be piloted in African, Latin American and Asian developing countries. UNEP have made available 150 000 USD for its implementation, (CB-07-01d– Building National Capacity).

At the 9th International Conference of the Global Spatial Data Infrastructure Association in Santiago, Chile, INPE presented: “TerraLib/TerraView: Free Open Source Technologies to Build Customizable Geographical Applications”. It was an opportunity to be in contact with planners, decision makers, developers and general users of OS solutions to identify their needs and gaps. The TerraView team created a user tutorial in English, provided with a sample data set, making it possible for users that don’t speak Portuguese to learn its basic use. Specialized training material for e-learning is still under development. However, a first experience of an e-course in TerraLib programming was carried on during 2006, in the context of the project eduGILA - Network for Education in Geoinformatics. (CB-07-01e - Open source development)

Slow progress has been made with tasks (CB-07-01c - Capacity building indicators), which is scheduled to start later this year.

Progress has also been made with developing capacity building activities in each societal benefit area:

The Chlorophyll Global Integrated Network (ChloroGIN) (EC 06 07) project was initiated following recommendations of the sponsored by GEO, 18 - 22 Sept 2006. ChloroGIN aims to promote *in situ* measurement of chlorophyll in combination with satellite derived estimates. The task aims at developing the human resource, institutional and infrastructure capacity related to ChloroGIN. This coordination effort represents an early achievement for GEO.

Following the workshop in Buenos Aires on 16 and 17 November 2006, the development of a proposal for the implementation of the WA-06-07 (Capacity Building Program for Water Resource Management), was initiated. During the quarter several inputs have been received for the proposal and the concept was presented and discussed at the Third Integrated Global Water Cycle Observing Strategy theme planning meeting in Washington, DC.

In task WE-06-05 (Numerical Weather Prediction), following the success of Capacity Building Workshop in Seoul, 9-13 April 2007, efforts are ongoing to plan and co-organize regional workshops to fill in the gaps and further support ongoing initiatives. The INM (Spain) is planning a workshop in October 2007 in Santa Cruz de la Sierra (Bolivia) for Latin American NMHS. The U.S.A. will lead a training workshop in Botswana or South Africa in the fall 2007 timeframe.

Due to the resignation of the task lead for AG-06-07 Training Modules for Agriculture, the task has not progressed. Discussions are underway with Uganda to lead this task and develop and build on the resource material provided by the previous task lead.

Generally, tasks related to capacity building, both as a consequence of the strategy implementation and developing capacity within each specific SBA are making good progress. However, participation within these tasks needs to be broadened, especially developing countries. The update of the work plan also provides an opportunity to further develop capacity building tasks for each SBA in accordance with the GEO capacity building strategy.

The greatest initial challenges in implementing GEONETCast have been to work towards global coverage, engage users to identify needs, expand data and products being transmitted beyond meteorology, and demonstrate an initial technical capability. Capacity building needs are addressed and developing countries have benefited from this program of distributing near real-time data and products from GEOSS.

The task team continues to work with the GEO User Interface and Capacity Building Committees and Members to incorporate data and products, and reception requirements to meet user needs in all GEO

societal benefit areas, and further develop regional user communities as well as thematic user communities through planned regional workshops or fora. With the commitments of three main hub operators EUMETSAT, US/NOAA, CMA, and with Russia as an additional prospective contributor, the near global coverage of GEONETCast successfully demonstrated an initial technical capability and is expected to reach in 2007. The regional GEONETCast Americas operational capability is expected in place by early October. Workshop will be held in 10-12 October 2007 in Beijing, China on improving access to EO data for developing countries. This Workshop will feature progress on GENETCast. The GEONETCast Implementation Group plan will refine details for developing an initial operational capability with the perspective of a demonstration the Cape Town Summit.